

Knowledge Translation of Interprofessional Collaborative Patient-Centred Practice: The Working Together Project Experience

Application des connaissances de la pratique interprofessionnelle en collaboration axée sur le patient: l'expérience du projet *Working Together*

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Résumé de l'article

Le projet *Working Together* (WT) comprend la conception et la production d'une ressource d'apprentissage en ligne pour les équipes de professionnels prodiguant des soins de santé de longue durée (SLD) afin que les connaissances relatives à la pratique interprofessionnelle en collaboration axée sur le patient (PICAP) puissent être facilement accessibles, puis transférées dans le milieu de travail. L'objectif de cet article est de mieux comprendre le processus d'application des connaissances dans la formation continue des professionnels de la santé en documentant notre expérience à l'aide de Lavis et coll. (2003), en établissant un cadre théorique pour le transfert des connaissances et en mettant en évidence l'incidence de cette approche sur la conception, le développement, la réalisation et l'évaluation du programme WT. Cinquante-neuf pharmaciens, médecins, infirmiers et infirmières, infirmiers et infirmières praticiens de 17 centres de SLD en Ontario, au Canada, ont participé à ce projet. L'efficacité de l'application des connaissances de la PICAP à l'échelle du projet WT a été évaluée à l'aide du modèle d'apprentissage axé sur la demande (DDL) (MacDonald, Breithaupt, Stodel, Farres et Gabriel, 2002) afin de déterminer les réactions des apprenants à la ressource d'apprentissage. Des données tirées de prétest et de posttest quantitatifs ainsi que d'entrevues qualitatives ont révélé que les apprenants étaient satisfaits de l'expérience d'apprentissage que procure la ressource en ligne WT, qu'ils ont acquis de nouvelles connaissances et aptitudes concernant la PICAP et mis en application ces connaissances dans leur milieu de travail, et que l'apprentissage a eu un effet positif sur les pensionnaires dont ils prennent soin.

KNOWLEDGE TRANSLATION OF INTERPROFESSIONAL COLLABORATIVE PATIENT-CENTRED PRACTICE: THE WORKING TOGETHER PROJECT EXPERIENCE

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ABSTRACT. The Working Together (WT) project involved the design and delivery of an online learning resource for healthcare teams in long-term care (LTC) so that knowledge regarding interprofessional collaborative patient-centred practice (ICPCP) could be readily accessed and then transferred to the workplace. The purpose of this paper is to better understand the process of knowledge translation in continuing education for healthcare professionals by documenting our experiences using Lavis et al.'s (2003) organizing framework for knowledge transfer, and highlighting the impact this approach had on the design, development, delivery, and evaluation of the WT program. Fifty-nine pharmacists, physicians, nurses, and nurse practitioners from 17 LTC homes across Ontario, Canada participated in this project. The effectiveness of the knowledge translation of ICPCP through the WT project was evaluated using the Demand-Driven Learning Model (DDLM) evaluation tool (MacDonald, Breithaupt, Stodel, Farres, & Gabriel, 2002) to assess learners' reactions to the learning resource. Data from quantitative pre-post surveys and qualitative interviews revealed that learners found using the WT online resource to be a satisfactory learning experience, obtained new knowledge and skills regarding ICPCP, transferred knowledge to the workplace, and reported that learning had a positive effect on the residents they cared for.

APPLICATION DES CONNAISSANCES DE LA PRATIQUE INTERPROFESSIONNELLE EN COLLABORATION AXÉE SUR LE PATIENT: L'EXPÉRIENCE DU PROJET WORKING TOGETHER

RÉSUMÉ. Le projet *Working Together* (WT) comprend la conception et la production d'une ressource d'apprentissage en ligne pour les équipes de professionnels prodiguant des soins de santé de longue durée (SLD) afin que les connaissances relatives à la pratique interprofessionnelle en collaboration axée sur le patient (PICAP) puissent être facilement accessibles, puis transférées dans le milieu de travail. L'objectif de cet article est de mieux comprendre le processus d'application des connaissances dans la formation continue des professionnels de la santé en documentant notre expérience à l'aide de Lavis et coll. (2003), en établissant un cadre théorique pour le transfert des connaissances et en mettant en évidence l'incidence de cette approche sur la conception, le développement, la réalisation et l'évaluation du programme WT. Cinquante-neuf pharmaciens, médecins, in-

firmiers et infirmières, infirmiers et infirmières praticiens de 17 centres de SLD en Ontario, au Canada, ont participé à ce projet. L'efficacité de l'application des connaissances de la PICAP à l'échelle du projet WT a été évaluée à l'aide du modèle d'apprentissage axé sur la demande (DDLDM) (MacDonald, Breithaupt, Stodel, Farres et Gabriel, 2002) afin de déterminer les réactions des apprenants à la ressource d'apprentissage. Des données tirées de prétest et de posttest quantitatifs ainsi que d'entrevues qualitatives ont révélé que les apprenants étaient satisfaits de l'expérience d'apprentissage que procure la ressource en ligne WT, qu'ils ont acquis de nouvelles connaissances et aptitudes concernant la PICAP et mis en application ces connaissances dans leur milieu de travail, et que l'apprentissage a eu un effet positif sur les pensionnaires dont ils prennent soin.

An essential component of the learning healthcare system is the capacity to continually improve approaches to gathering and evaluating evidence, taking advantage of new tools and methods. As technology advances and our ability to accumulate large quantities of clinical data increases, new challenges and opportunities to develop evidence on the effectiveness of interventions will emerge. (Olsen, Aisner, & McGinnis, 2007, chap. 2, p. 1)

INTRODUCTION

Many researchers suggest that interprofessional collaborative patient-centred practice (ICPCP) will improve the quality of care delivered to patients (Hall, 2005; Headrick, Wilcock, & Batalden, 1998). Underlying this premise is the idea that if healthcare professionals collaborate with each other more effectively, then redundancies in the healthcare system will be reduced, knowledge among healthcare providers will be shared, understanding of other healthcare professionals' roles and responsibilities will increase, and, consequently, the quality of patient care will improve. Effective communication and collaboration between healthcare professionals within the healthcare system are paramount in order to ensure that evidence for best healthcare practices is being shared, delivered, and implemented at the place of patient care. Moving towards an interprofessional model of healthcare service delivery can be facilitated by continuing education that meets the needs of healthcare professionals and includes relevant content that can be transferred to the workplace using strategies that are flexible and convenient. Accessible education programs that promote education for interprofessional collaborative patient-centred practice (IECPCP) and address the gap between evidence-based research and the implementation of best practices in the workplace are desperately needed. Given that healthcare practitioners are working adults with varied work schedules, heavy clinical workloads, discipline-based knowledge, and a multitude of personal responsibilities, knowledge translation through eLearning technologies may represent a viable approach for enhancing the ICPCP skills of healthcare teams.

Online delivery modes allow for flexibility in scheduling and help bring together individuals from different professions to engage in communication

and collaboration. Moreover, asynchronous components of eLearning can promote reflection and facilitate higher level learning and critical thinking. Indeed, eLearning has been shown to be a successful medium for the exchange, synthesis, and knowledge application and translation for healthcare practitioners (MacDonald, Stodel, & Casimiro, 2006; Skorga, 2002). Online knowledge translation can move continual professional development (CPD) to the point of care, target all professions, and allow content to be based on initiatives to improve healthcare (Williams, 2007). By emphasizing teamwork approaches, practice-based learning can be integrated with care delivery and the translation of ongoing ICPCP to the workplace.

Graham et al. (2006) pointed to the need for planned strategies when designing CPD and continuing education for knowledge translation. The WT project chose Lavis et al.'s (2003) organizing framework for knowledge transfer to guide the design, development, delivery, and evaluation of the learning resource. Although Lavis et al. used the term "knowledge transfer," as opposed to knowledge translation, we felt that their framework addressed the complexity of the exchange, synthesis, and application of ICPCP knowledge and skills by the researchers and users of the WT project. The theory behind Lavis et al.'s framework is that research organizations need to base their knowledge transfer strategies on current research evidence for best practices. To bridge the gap between research and practice, Lavis et al. proposed that organizations must consider five questions:

What should be transferred (the message)? To whom should research knowledge be transferred (the target audience)? By whom should research knowledge be transferred (the messenger)? How should research knowledge be transferred (the knowledge-transfer processes and supporting communications and infrastructure)? With what effect should research knowledge be transferred (evaluation)? (p. 222)

Within each of these five areas, Lavis et al. summarized the current research to propose an overall approach to knowledge transfer. We found that these five questions within the framework provided us with a strategy for translating ICPCP knowledge from the literature to the workplace. Lavis et al. emphasized that the details of the elements vary according to the target audience. In the WT project the target audience was comprised of service providers and managerial decision makers. Details of these knowledge transfer elements will be described later in the paper.

It is important that the ICPCP knowledge-base is used as a foundation for IECPCP to ensure knowledge is synthesized and implemented at the point of care. Graham et al. (2006) described this type of synthesis and application as the "Knowledge to Action Cycle". First, there needs to be the creation of knowledge through enhanced interactions between users (learners) and researchers. Then, there is the application or "translation" of this knowledge into the workplace. Many terms have been used to describe this transfer of

research to practice, including knowledge transfer (Lavis et al., 2003), knowledge translation (Graham et al., 2006), knowledge exchange (Canadian Health Services Research Foundation, 2007), and knowledge or research utilization (Estabrooks, Wallin, & Milner, 2003). We have adopted the term “knowledge translation” to describe the transfer of knowledge to practice through the WT project. Knowledge translation is “the effective and timely incorporation of evidence-based information into the practices of health professionals in such a way as to effect optimal health care outcomes and maximize the potential of the health system” (Knowledge Translation Program, Faculty of Medicine, University of Toronto).

A number of researchers have stressed the need for quality standards to ensure and protect the academic integrity of eLearning (Carstens & Worsfold, 2000; DeBard & Guidera, 2000; Salmon, 2000; Speck, 2000). The WT project used the Demand-Driven Learning Model (DDLM, MacDonald, Stodel, Farres, Breithaupt, & Gabriel, 2001) to aid the evaluation of the knowledge translation process. The DDLM is grounded within a constructivist framework and defined by five inter-related dimensions that, in concert, create a high-quality eLearning experience: structure (learner needs, learner motivation, learning environment, program goals, pedagogical strategies, learner evaluation, and learner convenience); three consumer demands of content (comprehensive, authentic, and researched), delivery (interactive, user-friendly, and appropriate use of tools), and service (resources, support, staff, accessibility, and responsiveness); and learner outcomes (personal and learning outcomes). An evaluation tool that aligns with the model was developed to assess the quality of eLearning against this standard and includes questions related to each of the DDLM constructs described above (Breithaupt & MacDonald, 2003; MacDonald, Breithaupt, Stodel, Farres, & Gabriel, 2002). These products have been used to design, develop, deliver, and evaluate eLearning across Canada and the United States.

The initial concern of the WT project was to develop and evaluate an online learning resource for healthcare teams in LTC homes to facilitate translation of ICPCP knowledge that could be readily transferred to the workplace to enhance healthcare providers’ abilities to act as a collaborative interprofessional team. The evaluation of the program has been documented elsewhere (see MacDonald, Stodel, & Chambers, 2008). In this paper, our purpose is to better understand the process of knowledge translation in continuing education for healthcare professionals by documenting our experiences using Lavis et al.’s (2003) organizing framework for knowledge transfer and highlighting the impact this approach had on the design, development, delivery, and evaluation of the WT program. Moreover, the ways in which the DDLM affected design, development, delivery, and evaluation decisions will also be presented. By focusing on some of the issues involved in the knowledge translation process we add to the literature, particularly with regards to healthcare education

and online learning. Moreover, we hope that our experiences will help others wanting to gain a better understanding of knowledge translation with regard to online learning for healthcare practitioners.

THE KNOWLEDGE TRANSLATION PROCESS IN THIS STUDY

1. What should be transferred (the message)?

Lavis et al. (2003) stated that “actionable messages” need to be transferred in the knowledge translation process. In this learning resource, the “message” or content revolved around the development of ICPCP skills and knowledge and their application in the workplace. The concepts of ICPCP described by Way, Jones, and Baskerville (2001) in their work with family physicians and nurse practitioners were used. Way et al. described collaborative practice as an interprofessional process for communication and decision-making that allows the knowledge and skills from different disciplines to influence the delivery of care. They suggested that collaboration comprises seven elements: cooperation, assertiveness, responsibility/accountability, autonomy, communications, coordination, and mutual trust and respect. Further, they provided clear role guidelines for the optimal use of these seven skills by the team members. The WT learning resource was designed to improve learners’ collaborative work practices along a continuum beginning with practitioners working independently, then practitioners working together through consultations and referrals, and finally a fully collaborative practice that involves the interdependent provision of healthcare.

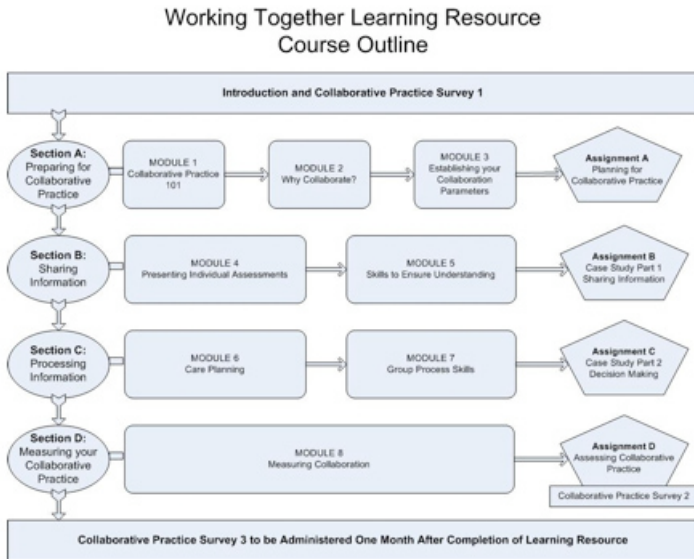
The goal of the learning resource was to provide primary healthcare professionals with the skills, knowledge, and motivation necessary to enhance their ability to act as a collaborative interprofessional team while providing clinical care to elderly people in primary, community, and/or LTC facilities. The learning resource comprises four sections that are split into a total of eight modules (see Figure 1). The four sections teach the learners to prepare for collaborative practice, share information, process information, and measure their collaborative practice. In each module within the sections, learners are required to read text-based content, complete online activities and worksheets, listen to audio-clips, and view video-clips. To promote the application of knowledge, or what Graham et al. (2006) called the “action” phase, at the end of each section learners were asked to meet face-to-face with their team to complete a group assignment that involves discussion and application of the material taught in the preceding modules. The entire learning process required approximately 6-8 hours of online learning and 4 hours of team meetings.

2. To whom should research knowledge be transferred (the target audience)?

When selecting the target audience for knowledge transfer, Lavis et al. (2003) suggested:

The first step should be to ask who can act on the basis of the available research knowledge; the second step should be to ask who can influence those who can act; and the third step should be to ask with which of these target audience(s) we can expect to have the most success. (p. 225)

FIGURE 1. *Course outline*



Seventeen not-for-profit/charitable ($n = 10$), for-profit ($n = 5$), and municipal ($n = 2$) LTC homes across Ontario, Canada participated in this project. The project involved 59 health professionals forming three- or four-member teams comprising pharmacists, physicians, nurses, and/or nurse practitioners who worked in these homes. These participants had been healthcare practitioners for between 1 and 38 years (mean = 18.90 years, SD = 9.83). Fifty-one (86.4%) learners completed the learning and its evaluation within the project timelines. The healthcare practitioners selected to participate were considered “early adopters” of both ICPCP and eLearning. Many participants in this group had already identified a need for such a resource. These four professions were chosen because the subject matter experts believed these professionals had the most “explicit” or formal knowledge base in LTC; their profession was represented in virtually all LTC homes; and they are often responsible for educating and empowering staff, residents, and families.

Once the target audience has been selected, the knowledge translation approach must be tailored towards the needs of this group (Lavis et al., 2003). The content of an online IECPCP resource would be different for different levels of healthcare providers. Since the purpose of the WT project was to develop an online learning resource for family physicians, pharmacists, nurses,

and nurse practitioners in LTC, the learning resource was tailored specifically for this target audience, consistent with Lavis et al.'s organizing framework.

3. By whom should the research knowledge be transferred (the messenger)?

The credibility of the “messenger” is important to knowledge transfer (Lavis et al., 2003). The learning resource was developed in collaboration with experts from the Élisabeth Bruyère Research Institute; Bruyère Continuing Care; and the University of Ottawa's Faculty of Education, Centre for eLearning, Department of Family Medicine, and the Primary Health Care Nurse Practitioner Program in the School of Nursing. The team included:

- A subject matter expert from each of the three disciplines (medicine, nursing, pharmacy)
- Two subject matter experts in the area of ICPCP
- A curriculum/instructional designer
- An eLearning development team including programmers and graphic designers
- Evaluators with expertise in curriculum design and eLearning
- A project manager and a project coordinator

In addition, a needs analysis workshop with physicians, pharmacists, nurses, and nurse practitioners was conducted in order to identify themes and concerns surrounding ICPCP that should be addressed in the learning resource. In this way, feedback from the end-users was used to inform the content of the resource, supporting the “exchange” process necessary for knowledge translation (Graham et al., 2006; Lavis et al., 2003).

Following these initial workshops, the learning objectives were identified and relevant content, activities, and strategies to support knowledge translation were developed. Content was created based on input from the subject matter experts as well as the curriculum/instructional designer, an expert in teamwork and communications training. As the content was being written, subject matter experts continually reviewed it to ensure it was relevant to their profession. In addition, eLearning experts continually reviewed the content to ensure it aligned with sound online pedagogical principles. Once the content was approved, the curriculum/instructional designer created storyboards for the programmers who used them to develop the online learning resource. Feedback was provided at each step of the process by the subject matter experts, pedagogy team, and Project Steering Committee and any necessary revisions were made.

There were several reasons for assembling the diverse team described above to participate collaboratively in this project. Collaborative research involves viewing the problem from multiple perspectives, leading to a better understanding of the issue being investigated (Gallagher, Easterling, & Lodwick, 2003; Herrington & Herrington, 2006; Karim, 2001). By grouping a variety of partners, a wide range of attitudes, beliefs, experiences, thoughts, and opinions are uncovered

(Sohng, 1995). Involving the end-users of the learning resource in the actual design process results in credibility and helps ensure a relevant product. The knowledge, experiences, and perspectives of individuals in the community can be drawn upon for maximum benefit as these individuals provide input on training needs, development of evaluation instruments, data collection, data analysis, and the ultimate interpretation of the program's impact on learners. Further, the healthcare clinicians who participated in the workshops, as well as the Steering Committee, played an important role in participant recruitment. They were able to identify early ICPCP adopters and encourage them to participate in the project. Authoritative endorsement by users facilitates the uptake and adoption of new knowledge and skills into the workplace (Hayward, Guyatt, Moore, McKibbin, & Carter, 1997; Lavis et al., 2003).

4. How should research knowledge be transferred (the knowledge-transfer processes and supporting communications infrastructure)?

Lavis et al. (2003) noted that for knowledge transfer to be successful, interactive rather than passive processes are most effective. Interaction is one of the things that makes eLearning attractive (Farres & Stodel, 2003; Stodel & Farres, 2002). Designing interactive online environments encourages learners to become actively involved in the learning process. By participating in, and interacting with, the environment, they are able to construct knowledge that is meaningful to them. This approach aligns with the constructivist philosophy of learning and is in contrast to traditional teaching approaches where learners take on a more passive role. By providing opportunities for reflection, communication, collaboration, negotiation, and problem-based thinking online, learners can process information and construct knowledge in meaningful ways so they are able to find and apply it when needed, thereby increasing knowledge translation. Indeed, the constructivist approach is the favoured approach for eLearning (Hill, 1997; Jonassen, Peck, & Wilson, 1999; Relan & Gillani, 1997).

Not only is interactivity a prerequisite for active learning, but it also allows learners to direct their own learning experiences. In an online learning environment there is no predetermined direction that the learners must follow (Polyson, Saltzberg, & Godwin-Jones, 1996). Consequently, by learning online, a learner-centred approach can be supported. Learners can navigate their way through the resource at their own speed so they can acquire knowledge and develop skills at their own pace. They can set their own learning goals, choose the material they wish to learn, the skills they wish to develop, the time they want to engage in this learning, the type and amount of feedback they desire, and the media format with which they wish to learn (e.g., text, chat, audio, visual, animation). Again, by making learning relevant, knowledge translation is more likely to occur. ELearning not only supports learner interactions with the material, but learners can also interact with each other and experts. These interactions can be public or individualized and personal; synchronous or

asynchronous. However, it is important to note that just because information is put online it does not mean that a quality active learning experience will result; a thoughtful design process is critical (Stodel, Farres, & MacDonald, 2009).

Having an online resource means that the learners can access the learning at any time and from any place they have an Internet connection. This accessibility is especially important for this target audience of busy healthcare professionals. Not only does it allow them to learn whenever they want, but it also provides access to learning at the point of care. Moreover, the online resource allows for the development of computer skills and confidence concurrently with the development of ICPCP skills.

5. With what effect should research knowledge be transferred (evaluation)?

Lavis et al. (2003) and Graham et al. (2006) acknowledged that evaluation of knowledge translation is a relatively unexplored area. This study placed a great deal of importance on the evaluation of the resource. This evaluation will play a critical role in continuing the two-way “exchange” process between learners and experts, rather than the one-way “producer-push” efforts (Lavis et al.). The findings from the evaluation will be used to refine and improve the learning resource for future learners and ensure best practices for online ICPCP knowledge translation are disseminated.

The evaluation of the learning resource was guided by the following research questions:

1. Did the learners have a positive reaction to the learning experience?
2. Did the learners acquire new knowledge and skills regarding ICPCP?
3. Was there a change in the learners’ attitudes towards the value and use of team approaches to care?
4. a) Was learning transferred to the workplace?
b) Did this result in an increase in ICPCP?
5. Was there organizational change regarding how care is delivered?
6. Did the residents’ well-being improve?

This project underwent an ethics review at the University of Ottawa. Various data collection tools were developed to facilitate the collection of qualitative and quantitative data that allowed the research questions to be answered. The rationale for collecting both qualitative and quantitative data within this study is derived from the notion that neither quantitative nor qualitative methods are sufficient to capture the trends and details of the situation (Ivankova, Creswell, & Stick, 2006). Many studies use mixed methods so that findings can be used to corroborate, elaborate, complement, or even contradict each other within the same study to allow for a more robust analysis (Brannen, 2005).

Learners completed three online surveys. Survey 1 was administered as learners logged onto the resource for the first time, and surveys 2 and 3 were adminis-

tered after the completion of all the learning activities. Survey 1 collected demographic information and assessed learners' collaborative practice knowledge, skills, behaviour, and attitudes. This survey comprised four sections: Section A collected demographic information; Section B assessed learners' knowledge and skills with regards to collaborative practice and aligned with the learning objectives of the learning resource; Section C was the 14-item Quality of Care/Process subscale from the Attitudes Toward Health Care Teams Scale (Heinemann, Schmitt, Farrell, & Brallier, 1999); and Section D was Jones and Way's (Way et al., 2001) 9-item scale for assessing the extent of collaboration. Survey 1 therefore collected demographic information as well as information to help answer research questions 2, 3, and 4b.

Survey 2 obtained feedback on the resource, assessed whether the learning objectives had been met, and examined the learners' attitudes towards collaborative practice. This survey comprised three sections: Section A included questions from the DDLM evaluation tool (MacDonald et al., 2002); Section B assessed learners' knowledge and skills with regards to collaborative practice and aligned with the learning objectives of the learning resource; and Section C was the 14-item Quality of Care/Process subscale from the Attitudes Toward Health Care Teams Scale (Heinemann et al., 1999). The purpose of the Attitudes Toward Health Care Teams Scale (Heinemann et al.) is to determine learners' attitudes towards the value and efficiency of teamwork. The scale was psychometrically tested with a sample of 973 individuals from interdisciplinary geriatric healthcare teams and found to be valid and reliable with this population (Heinemann et al.). Survey 2 collected information to help answer research questions 1, 2, and 3.

Survey 3 assessed the learners' collaborative practice and the impact of the learning resource in terms of organizational change and resident well-being. Survey 3 contained two sections: Section A was Jones and Way's (Way et al., 2001) 9-item scale for assessing the extent of collaboration and Section B included questions from the DDLM evaluation tool (MacDonald et al., 2002). Survey 3 was designed to collect information to help answer research questions 4, 5, and 6.

Quantitative data analysis involved calculating descriptive statistics for the learners' responses on the closed-answer survey items. In addition, paired t-tests and ANOVAs were used to determine whether the participants' scores relating to collaborative practice knowledge, attitudes, and behaviour changed over time and whether there were any differences between professions.

Eight focus group interviews were conducted with eight intact three- or four-member teams of learners after they had completed the learning resource. The purpose of the focus group interviews was to discover the healthcare teams' experiences with the learning resource, specifically in terms of the DDLM constructs and in relation to the transfer of new knowledge and skills to

the workplace. The interviews were designed to identify the strengths of the learning resource and provide recommendations for where the resource can be further refined and improved (see Appendix for the interview schedule). Teams were chosen based on their willingness to participate in an interview and the availability of both the participants and the pedagogy team. However, attempts were made to select teams that differed in the type of home in which they worked and team functioning when. The interviews took 45-90 minutes and were audio-taped with the participants' permission and transcribed verbatim by a research assistant who did not attend the interviews and did not know the participants. The transcripts were returned to the participants who were asked to read and amend them if they felt it would clarify or better represent their answers.

Qualitative data analysis involved searching the focus group interview transcripts for information on the following: learners' reactions to the learning resource; evidence of learners implementing new knowledge and skills in the workplace; benefits to residents; and recommendations for maximizing the use of the learning resource with healthcare professionals in the future. The constant comparative method described by Merriam (1998) was used to identify categories of data. These categories were guided by the purpose of the study, the research questions, and the meanings made explicit by the participants (Merriam).

FINDINGS

The findings of the evaluation are presented for each research question.

1. Did the learners have a positive reaction to the learning experience?

For the majority of the questions on the DDLM evaluation tool in survey 2, learners' responses spanned the full spectrum of possible response options, though on average the responses were positive (see Table 1). Relating to content, learners generally agreed there were appropriate amounts of team activities, online resources, and offline activities. Moreover, they indicated that the content included information that they need and that will enable them to deal with new situations at work.

With regards to delivery, learners were most neutral on the items that related to navigation and organization, and responded more positively to the items assessing ease of access to a computer and the learning resource being uncluttered. Both qualitative and quantitative data further revealed that, overall, learners agreed that they received support from their organization while using the learning resource. The learners agreed that the learning resource provided them with opportunities to practice what they learned and engage in self-evaluation. They also tended to agree that the resource kept their interest, met their learning needs, and respected their current knowledge and experience.

TABLE 1. *Learners' responses to the items in the DDLM evaluation tool (N=51)*

	Min*	Max	Mean	SD
The material in the learning resource was boring.	1.00	5.00	2.35	.98
In this learning resource there was an appropriate amount of team activities.	1.00	5.00	3.90	.92
There were enough offline activities in the learning resource.	1.00	5.00	3.55	.78
The content included information that I will be able to use to deal with new situations at work.	1.00	5.00	3.80	.83
The content included learning tasks that were similar to those I face at work.	1.00	5.00	3.69	.93
The content included information that I need in my work.	1.00	5.00	3.82	.97
The content included enough online resources.	1.00	5.00	3.57	.92
The content was well organized.	2.00	5.00	3.65	.74
The content used words I did not understand.	1.00	4.00	1.65	.74
The content was too difficult.	1.00	4.00	1.80	.66
The material in the learning resource was organized so it was easy to find things.	1.00	5.00	3.31	.93
The material in the learning resource was uncluttered.	2.00	5.00	3.67	.77
It was easy to access a computer when I needed to.	1.00	5.00	3.86	1.20
In this learning resource it was easy to "navigate" through the content.	1.00	5.00	3.10	1.17
In this learning resource the buttons on the screens did what they were supposed to do (e.g., links to others pages).	1.00	5.00	3.37	1.23
While using the learning resource I received support from my organization	1.00	5.00	3.71	1.10
In the learning resource I was replaced when I left my work duties to do this learning.	1.00	5.00	1.94	1.01
In the learning resource there were opportunities for me to practice what I learned.	1.00	5.00	3.69	.93
In the learning resource there were opportunities for self-evaluation.	2.00	5.00	3.94	.70
In the learning resource the content and learning activities supported the learning objectives.	2.00	5.00	3.86	.69
The learning resource kept my interest.	1.00	5.00	3.59	1.04
The learning resource met my learning needs.	1.00	5.00	3.49	1.01
The learning resource respected my current knowledge.	1.00	5.00	3.49	1.01
The learning resource respected my experience.	1.00	5.00	3.45	.99
Having this learning resource online made learning more convenient than learning face-to-face.	1.00	5.00	3.76	1.21
The learning resource was in line with my expectations	1.00	5.00	3.43	.88

*Response options: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

2. Did the learners acquire new knowledge and skills regarding collaborative practice?

Several learners reported in the interviews that they acquired new and relevant knowledge and learned new skills. Learners developed a better understanding of collaborative practice and of the roles of practitioners from other professions. An added benefit for some of the learners was improving their computer skills. Before the learners started the learning resource, they were asked to rate how confident they were at being able to achieve each of the resource's 16 learning objectives on a scale of one to five (1 = Not at all, 5 = Extremely). Immediately following completion of the learning resource they were asked to rate their confidence on each of these items again. The mean scores and standard deviations for each question before and after completion of the learning resource are presented in Table 2. Repeated measures t-tests were conducted to determine whether there were significant changes in learners' scores on each of these questions before and after they had used the resource.

Following the completion of the learning resource, learners were significantly ($p < .05$) more confident that they could do each of the skills that related to the learning objectives, except for one: learners did not feel more confident that they could communicate their individual position on a clinical topic in a clear, concise, and relevant manner. Learners were asked whether they felt it was the learning resource that had helped them improve their knowledge and skills relating to collaborative practice, and the majority of the learners (86%) attributed the improvements to the learning resource. This finding was confirmed in the focus groups.

TABLE 2. Changes in learners' confidence regarding their skills and knowledge following completion of the learning resource (N=51)

Learning Objectives	Mean Before (SD)	Mean After (SD)	t	df	Sig. (2-tailed)
Accurately define what is meant by collaborative practice.	3.33 (.89)	4.08 (.80)	-	50	.000
Discuss collaborative practice with my colleagues in a language that is commonly understood.	3.12 (.91)	4.00 (.82)	-	50	.000
Identify the steps a team should follow to ensure effective collaboration.	2.67 (1.01)	3.71 (.86)	-	50	.000
Define the elements needed to collaborate effectively.	2.69 (.97)	3.67 (.82)	6.276	50	.000
Explain the benefits of collaborating with my colleagues.	3.45 (.78)	3.96 (.92)	5.795	50	.002
List interpersonal, organizational, and/or systemic barriers that impede a team's ability to collaborate.	3.14 (.85)	3.88 (.86)	3.359	50	.000
Recognize the result of a team that is collaborating effectively.	3.35 (.89)	4.00 (.82)	4.547	50	.000
Recognize the processes that facilitate collaboration.	2.96 (.96)	3.82 (.82)	5.719	50	.000
Suggest a collaborative structure and communication process that will be effective in overcoming barriers to collaborative practice.	2.49 (1.01)	3.55 (.83)	7.093	50	.000
Communicate my individual position on a clinical topic in a clear, concise, and relevant manner.	3.55 (.86)	3.88 (.84)	-	50	.052
Develop and maintain an environment of trust by communicating in a way that ensures each team member feels valued and respected.	3.63 (.82)	4.12 (.71)	1.993	50	.002
Use appropriate questioning techniques and active listening skills to ensure team members understand each others' positions.	3.41 (.92)	3.94 (.83)	3.346	50	.002
Negotiate responsibilities within my team.	3.24 (.93)	3.96 (.69)	3.273	50	.000
Facilitate team meetings/communications to ensure they are inclusive of all team members' opinions.	3.37 (.80)	3.90 (.78)	5.073	50	.001
Assess a clinical case in a collaborative manner.	3.39 (.85)	3.96 (.89)	3.489	50	.000
Effectively problem-solve and make decisions with a team.	3.65 (.80)	3.98 (.84)	3.754	50	.031

* Response options: 1 = Not at all; 2 = Somewhat; 3 = Moderately; 4 = Very; 5 = Extremely

3. Was there a change in the learners' attitudes towards the value and use of team approaches to care?

The mean scores and standard deviations for each question on the Attitudes Toward Health Care Teams Scale (Heinemann, et al. 1999) before and after completion of the learning resource are presented in Table 3. Repeated measures *t*-tests were conducted to determine whether there was a significant change in learners' attitudes towards collaborative practice before and after they had used the resource. No significant changes in learners' responses on each question relating to their attitude towards collaborative practice were found ($p > .05$; see Table 3) except one – The team approach permits health professionals to meet the needs of family caregivers as well as residents. A composite score for the complete questionnaire was then calculated for each learner by adding the learner's scores for each question together (NB: three items were reverse coded). No significant changes were found in the composite score either ($t = -1.209$, $p > .05$).

Despite the fact that the quantitative survey data revealed no significant changes in the learners' attitudes, in the interviews at least one learner, a physician, provided an example of how he had changed his attitude towards collaborative practice. The use of a mixed methods approach allowed this data to emerge:

I had a fear that this was going to be a matter of "We, the team, are going to make decisions but I [the doctor] am going to be on the hook for any bad things that happen." It was this whole sense of the doctor has to make the medical decisions.... So, I think this project, and working through it with these guys, relieved a lot of my anxiety about this whole approach.... So, personally, that's been a big change for me.

4. a) Was learning transferred to the workplace?

Following completion of the learning resource, learners were asked whether they had applied new knowledge and skills in the workplace and whether they had initiated new ideas and/or projects as a result of having utilized the learning resource. The majority of the learners indicated that they had (see Figure 2). The interview data provided further support that the learners had applied ICPCP knowledge and skills to the workplace. Much of it related to communication skills, a prominent theme in the data. For example, one nurse reported that her participation in the learning resource had changed how she runs her weekly team conferences. She suggested that her improved listening skills and increased assertiveness had resulted in more effective team meetings. Another nurse stated:

I really enjoyed it. I found I learned a lot and I'm excited about [applying] it. I've already tried some of the things, like [using] positive feedback and trying to get everybody on board with the team; because everybody contributes but if they don't feel recognized they stop [contributing].

TABLE 3. Changes in learners' attitudes towards collaborative practice following completion of the learning resource as assessed by the Attitudes Toward Health Care Teams Scale (Heinemann et al., 1999) (N=51)

	Mean Before ^a (SD)	Mean After (SD)	t	df	Sig. (2-tailed)
•Working in teams unnecessarily complicates things most of the time.	0.98 (1.12)	0.76 (0.99)	1.376	50	.175
The team approach improves the quality of care to residents.	4.69 (0.55)	4.53 (0.88)	1.344	50	.185
Team meetings foster communication among team members from different disciplines.	4.43 (0.70)	4.39 (0.94)	0.260	50	.796
Residents receiving team care are more likely than other residents to be treated as whole persons.	4.25 (0.93)	4.33 (1.01)	-	50	.610
Working on a team keeps most health professionals enthusiastic and interested in their jobs.	4.06 (0.81)	4.22 (0.92)	-	50	.271
Developing a resident care plan with other team members avoids error in delivering care.	4.04 (1.00)	3.96 (1.00)	0.489	50	.627
Health professionals working on teams are more responsive than others to the emotional and financial needs of residents.	3.69 (0.95)	3.80 (1.00)	-	50	.466
•Developing an interdisciplinary resident care plan is excessively time consuming.	1.86 (1.27)	1.73 (1.51)	0.627	50	.533
The give and take among team members helps them make better resident care decisions.	3.94 (0.86)	4.12 (0.77)	-	50	.228
•In most instances, the time required for team meetings could better be spent in other ways.	1.29 (1.08)	1.29 (1.24)	0.000	50	1.000
Hospital patients who receive team care are better prepared for discharge than other patients.	3.73 (1.25)	3.96 (1.23)	-	50	.214
The team approach makes the delivery of care more efficient.	3.92 (0.89)	4.18 (0.99)	-	50	.129
The team approach permits health professionals to meet the needs of family caregivers as well as residents.	3.92 (0.89)	4.25 (0.91)	-	50	.034
Having to report observations to the team helps team members better understand the work of other health professionals.	4.33 (0.65)	4.53 (0.86)	-	50	.115

•Response options: 0 = Strongly Disagree; 5 = Strongly Agree

•Reverse-coded item

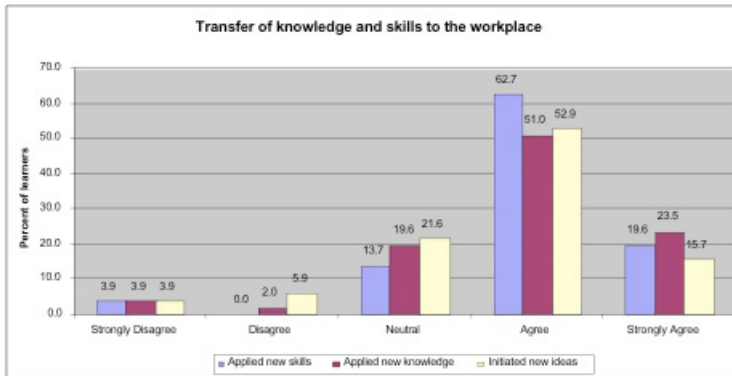
Another nurse reported: “You might find yourself stopping and listening more and trying to say, ‘OK, now is this exactly what you said?’” A physician indicated that his team was now communicating differently with each other:

We kind of dreamed about this [but] we had no way of making [it] happen until this [project] came along.... We have this common bond [in] that [now] we’ve gone through this process we probably talk differently to each other, we work differently.

When the learners were asked in the focus group interviews if they felt that the learning resource resulted in an increase in interprofessional collabora-

tion between team members, most learners indicated that they felt that team functioning had improved. Sometimes they noted this was due to an increased understanding of each others' roles and other times it was a result of better communication among team members. One pharmacist stated, "From my perspective, we weren't a team before so, yes, it's 100% improved!"

FIGURE 2. *Transfer of knowledge and skills to the workplace*



4. b) *Did this result in an increase in ICPCP?*

When the learners were asked in the interviews if they felt that the learning resource resulted in an increase in ICPCP among team members, most learners indicated that they felt that team functioning had improved. Learners noted this was due to an increased understanding of each others' roles and at other times it was a result of better communication among team members. A pharmacist explained how, as a result of using the resource with her team, she felt more comfortable communicating with the physician, which resulted in a more efficient and effective practice:

Before, my collaboration with the physician was primarily in the form of a written medication assessment and I was very tentative or reluctant to recommend some things. Whereas now [that the physician] and I have spoken, I am more willing to share knowledge and collaborate.

One nurse explained how, having used the learning resource, she now makes a conscious effort to communicate and collaborate with her staff:

I make sure that I include the RPNs [Registered Practical Nurse] who are in charge of each of my units... A lot of times they have insight that I don't have because they're doing the bedside, they're doing the medication. I think to some degree I did it before but I'm more conscious of it now and it really improves the care.

The project also cultivated a sense of camaraderie among the individuals who took the learning resource and strengthened team cohesion. One nurse

reported that her team was collaborating to develop more effective procedures in their workplace.

Data from Jones and Way's Collaborative Practice Survey (Way et al., 2001) supported the learners' verbal reports that their collaborative practice had improved following their use of the learning resource. Repeated measures t-tests were conducted to determine whether there were significant changes in aspects of learners' collaborative practice before and after they had used the resource. Following completion of the learning resource, learners were significantly ($p < .05$) more likely to engage in the different aspects of collaborative practice than they were before they engaged in the learning resource (see Table 4).

TABLE 4. Changes in learners' collaborative practice following completion of the learning resource as assessed by Jones and Way's Collaborative Practice Survey (Way et al., 2001) (N=51)

	Mean Before ^a (SD)	Mean After (SD)	t	df	Sig. (2-tailed)
My team and I . . .					
Plan together to make decisions about the care for the residents.	3.06 (1.54)	2.29 (1.01)	3.917	50	.000
Communicate openly as decisions are made about resident care.	2.92 (1.53)	2.08 (1.02)	4.374	50	.000
Share responsibility for decisions made about resident care.	3.57 (1.55)	2.33 (1.18)	6.394	50	.000
Co-operate in making decisions about resident care.	2.90 (1.37)	2.12 (0.99)	4.305	50	.000
Consider nursing, medical and pharmaceutical concerns in making decisions about resident care.	2.63 (1.11)	1.98 (0.76)	4.096	50	.000
Co-ordinate implementation of a shared plan for resident care.	3.39 (1.55)	2.37 (1.08)	5.175	50	.000
Demonstrate trust in the others' decision making ability in making shared decisions about resident care.	2.76 (1.32)	1.86 (0.78)	5.585	50	.000
Respect the others' knowledge and skills in making shared decisions about resident care.	2.51 (1.36)	1.65 (0.66)	4.591	50	.000
Fully collaborate in making shared decisions about resident care.	3.55 (1.58)	2.47 (1.14)	5.153	50	.000

^aResponse options: 1 = Strongly Agree; 2 = Agree; 3 = Somewhat Agree; 4 = Neutral; 5 = Somewhat Disagree; 6 = Disagree; 7 = Strongly Disagree

5. Was there organizational change regarding how care is delivered?

Following completion of the learning resource, learners were asked whether they had requested any changes be made in their organization as a result of participating in the learning resource. Almost half the learners (49%) either agreed or strongly agreed that they had requested changes be made in their organization as a result of participating in the learning resource. One pharmacist explained that his team had come up with a more efficient and effective approach for handling medication orders and questions to the pharmacist:

I'm not here on staff, and quite often I will get phone calls in the middle of a busy, hectic day with a complicated question from [the Advanced Practical Nurse] and she can't see what's happening in the pharmacy where all hell is breaking loose.... For me to be able to answer just off the top of my head, at times doesn't give the best care for the patient. So we've talked about faxes or e-mails or things like this so that they can send me all the information, I can look at it appropriately, find the time to assess it appropriately, and then respond.

6. Did the residents' well-being improve?

In the questionnaire learners completed after finishing the learning resource, 73% of the learners agreed or strongly agreed that they felt they delivered a better service to the residents they care for as a result of participating in the learning resource. In the interviews, when the participants were asked if they had recognized any improvements in the residents' care as a result of their team's involvement in the project, the most common reply was that it was too early to tell. However, some indicated that they were sure that there would be improvements made with time. Further, in the interviews, learners provided concrete examples of how participating in the learning resource had affected the residents' quality of care. One example will be shared here. It involved a young resident who had suffered a stroke. This individual was frightened, did not want to be among large groups of people, was unable to communicate effectively, and was experiencing severe pain. The resident's family wanted her to have higher doses of pain medication; however, this level of medication would likely make the resident too sleepy to eat and cause dietary complications. Obviously, this was a source of concern to the healthcare team. The team collaborated, shared different perspectives and opinions, and came up with a safer and more effective solution for the resident. The physician involved explained the case:

[This individual] has really complicated pain issues, anxiety issues, communication issues, and nutritional issues that all feed into each other. And it was really great to see everybody coming at it with, "This is the issue I have [in my] discipline." Then hearing [other people tell me] what I'm doing isn't working. And then we were talking about adjusting pain medications and the dietician spoke up a[s she] was really worried.

One of the nurses involved went on to explain that rather than just listening to the resident's family's concerns and addressing them, as a team they were able to discuss the situation and then present a definite plan to the family in a professional manner. The Director of Care noticed an improvement in the resident after the team had collaborated and implemented their care plan:

The resident ... happens to be two doors from my office. I'm hearing less crying, I'm hearing less stress, I'm getting less complaints from the family. I have the family saying they're thrilled with care now, whereas three weeks ago they were going to walk out the door and leave.

DISCUSSION AND FUTURE DIRECTIONS

The WT project facilitated knowledge translation through the use of an online learning resource designed to enhance ICPCP among healthcare professionals. Performance measures specific to the target audience and the objectives of the learning resource were used. Overall, the learning resource was a success. Data from quantitative pre-post surveys and qualitative focus group interviews provided evidence that learners found using the resource to be a satisfactory learning experience, obtained new knowledge and skills regarding ICPCP, and transferred knowledge to the workplace. Early evidence further suggests that their learning had a positive effect on the residents. That there were no changes in the learners' attitudes as a result of participating in the learning resource could be due to the fact that they were "early adopters" and already had a positive attitude towards collaborative practice leaving less room for change to occur.

These findings are consistent with the goals of knowledge translation, where the expected outcome is to translate knowledge into practice through continuing education and professional development (Davis et al., 2003; Graham et al., 2006). Furthermore, this study made advances in the field of knowledge translation as it took steps towards evaluating the knowledge transfer process. However, the process of translating ICPCP into improved healthcare outcomes has only just started. In order to show continued success, ongoing evaluation of the uptake of new ICPCP knowledge and skills needs to be maintained. The next phase of the WT project is to "sustain the use of knowledge" (Graham et al., 2006). The feedback from the users during the evaluation of the learning resource will be used to revise the resource. In so doing, the "exchange" between users and experts continues. Input from LTC residents and their families will also be valuable as future editions of the learning resource are created.

Ho et al. (2004) argued that formal continuing education activities, such as conferences, workshops, and rounds, are insufficient means for healthcare providers to acquire new knowledge and apply it to practice. Instead, they advocated the use of practice-based learning. Practice-based learning includes self-directed learning, reflection "in" and "on" practice, and performance

improvement programs. In these activities, information and communication technologies can play a substantial role in the “application of newly acquired knowledge into practice, and capturing clinical indicators for health outcome measurement and performance improvement” (p. 92). The learning resource developed in this project has been and continues to be an example of a learning resource that combines continuing education and practice-based learning activities to accelerate the knowledge translation process.

Team, organizational, and institutional barriers can affect the development of collaborative teams (Cashman, Reidy, Cody, & Lemy, 2004). Practice level interventions, such as developing surveys on standards and performance measures on team effectiveness (Bateman, Wilson, & Bingham, 2002), practice sessions for team-building and problem-solving (Black & Westwood, 2004; Cashman et al.), self-management (Cashman et al.), and interdisciplinary rounds (Daniels, 1994), have been proposed to promote ICPCP. Similarly, organizational-level interventions, including strategic planning (Decchario-Marion, Jordan-Marsh, Traiger, & Saulo, 2001), leadership workshops (Black & Westwood), provision of support by identifying goals and implementing resources (Morey et al., 2002), and establishing protocols and guidelines on roles and responsibilities (Gibbon et al., 2002), can also support ICPCP.

Since knowledge translation focuses on outcomes and changing behaviour, it is important that it takes place in the site of practice (Davis et al., 2003). One of the benefits of eLearning is that learners are able to engage in the learning at their place of practice at a time that is convenient to them. Moreover, eLearning makes information and learning easily accessible when it is needed. ELearning also supports interactive learning environments that facilitate the active rather than passive processes that foster knowledge translation.

Information technology will play a large role in the future of knowledge translation. Essentially, the goal of knowledge translation is to reduce the gap between research and practice, which will ultimately lead to improved healthcare delivery. Information technology may help in reducing the time and expense of narrowing this gap. Walter Stewart of the Geisinger Health System discussed how using electronic health records can reduce this gap and increase real-time access to knowledge in the practice setting (Olsen et al., 2007). A specific example of how electronic health records can translate research into practice is as follows:

The pharmacy and therapeutics committee at Vanderbilt recommends use of cephepime instead of ceftazidime for antipseudomonal treatment. When a clinician begins to order ceftazidime, a web page comes up with the recommendation, radio buttons pre-computed as to how to apply the recommendations to the particular patient, and links to the evidence leading to the recommendation. This approach closes the gap between new information, learning, and translation into practice. The direct link to the evidence provides the hook for process to keep the recommendation up-to-date as information changes. (Stead, 2007, p. 6)

Knowledge translation occurs “within a complex system of interactions among researchers and users to accelerate the benefits of research . . . through improved health, more effective services and products, and a strengthened health care system” (Canadian Institutes of Health Research, 2007). Both Lavis et al. (2003) and Graham et al. (2006) have illustrated through their models of knowledge translation that the knowledge translation process is complex. Both models provide an excellent framework for the uptake and application of knowledge and the evaluation of the health outcomes from using the knowledge. Graham et al.’s “Knowledge to Action” model emphasizes the cyclical nature of the process, indicating that knowledge translation is never complete. Outcomes need to be continually evaluated and as new knowledge is created it must be incorporated into the action cycle. For these reasons, the “Knowledge to Action” model is preferred for use in future knowledge translation endeavours.

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APPENDIX

INTERVIEW SCHEDULE FOR LEARNERS

1. Can you describe your experience using the Working Together learning resource? (probe with regards to content, delivery, service, and structure). Did you like it? Did you benefit from it? Was it easy to use?
2. Have you used the new knowledge and skills that you learned at work? If so, can you give me an example of this? Was there anything that you learned in the learning resource that you would like to put into practice but are unable to? If so, why?
3. Do you feel that you are working better as a team because of this learning resource? If so, in what ways? What parts of it helped you work better as a team?
4. Do you feel you are able to care for the residents you work with better because of this learning resource? If so, in what ways?

IF TIME PERMITS:

5. What was the most rewarding or satisfying aspect of the learning resource?
6. What was the least rewarding or satisfying aspect of the learning resource? How could it be improved?

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